CLINICAL RISK ASSESSMENT FOR SURGERY

RECOMMENDATIONS

We recommend using both clinical risk assessment and RT-PCR* to screen for COVID-19 among asymptomatic individuals scheduled for non-emergency surgery. *(Very low quality of evidence; Strong recommendation)*

We recommend using both clinical risk assessment and Antigen-Rapid Diagnostic Test (Ag-RDT)** to screen for COVID-19 among asymptomatic individuals scheduled for non-emergency surgery **when RT-PCR testing is not available or when prolonged turnaround time is a concern.** *(Very low quality of evidence; Strong recommendation)*

**Always use high-risk PPE regardless of RT-PCR or Ag-RDT test results in areas with prevalence of 1% or higher*
***Ag-RDT should have a Sn of 80% and Sp of 97%*

Consensus Issues

Despite the very low quality of evidence, the majority voted to strongly recommend the use of both RT-PCR testing and clinical risk assessment to screen for COVID-19 among asymptomatic individuals scheduled for non-emergency surgery primarily due to the potential impact of a false negative result on the safety of the patient and health care staff involved as well as on infection control processes of hospitals. RT-PCR was also recommended as it is now readily available in most hospitals. However, a panelist suggested that RT-PCR and PPE should only be conditionally recommended in areas with prevalence rates of 1% or higher.

The specification of the sensitivity and specificity for the Ag-RDT was the reason for the strong recommendation on the use of clinical risk assessment and Ag-RDT to screen for COVID-19 among asymptomatic individuals scheduled for non-emergency surgery when RT-PCR testing is not available. However, other panelists are concerned if there is an available antigen test that would meet the set specification in terms of sensitivity and specificity.

EVIDENCE SUMMARY

Among asymptomatic individuals scheduled for non-urgent, non-emergency surgery, should RT-PCR and clinical risk assessment vs clinical risk assessment alone be done to screen for COVID-19?

Evidence Reviewers: Eva I. Bautista, MD, Patricia Pauline M. Remalante-Rayco, MD, Howell Henrian G. Bayona, MSc

Key Findings

Based on 1 cohort study with very low quality, the diagnostic accuracy of clinical risk assessment alone in detecting COVID-19 compared to RT-PCR was found to be poor, with a sensitivity of 0.42 (95% CI 0.15-0.72) and a specificity of 0.85 (95% CI 0.76-0.92). Clinical risk assessment also results in more false negative and false positive results.

Very low certainty evidence from one economic modeling study suggests that universal pre-endoscopy virus testing using Ag-RDT, standard RT-PCR, or rapid PCR combined with high risk PPE use in all patients irrespective of test results was more cost-effective compared to no pre-endoscopy testing and no high risk PPE use, at an assumed prevalence rate of 1% or higher among asymptomatic individuals.

Patients for elective surgery who test positive on any pre-operative COVID-19 tests or clinical assessment were at least 3 times more at risk of experiencing pulmonary complications or death compared to those who test negative based on 1 cohort study with very low quality. Delaying surgery to at least 7 weeks from a COVID-19 diagnosis also showed benefit. Given this data on the risks and benefits associated with a COVID-19 diagnosis as well as the high false negative rates of clinical risk assessment alone, clinical risk assessment would appear to cause more harm compared to more objective tests.

Introduction

The COVID-19 pandemic has led to deferral and postponement of surgeries, especially non-essential or elective ones, in institutions across the globe. Asymptomatic COVID-19 patients undergoing surgery are at a higher risk of postoperative mortality and ICU admission compared to those without COVID-19 [1,2,3]. The proportion of asymptomatic COVID-19 cases is reported to be 17.9% [4]. Hence, ascertaining the COVID-19 status of asymptomatic surgical candidates informs decisions to prevent viral transmission and reduce postoperative complications.

Recommendations for routine RT-PCR testing have been made for elective surgical candidates suspected of COVID-19 based on the availability of the test, turnaround time, availability of PPE and disease prevalence [5]. Its results also depend on sampling technique, specimen handling, and timing of specimen collection from symptom onset [6,7]. False negative rates for RT-PCR were estimated to reach as high as 16% [8].

Clinical risk assessment includes determining history of close contact with a confirmed COVID-19 case (i.e., within 6 feet for a total of 15 minutes or more) and evaluating symptoms. Risk is also considered high if a person has taken part in activities where physical distancing is difficult to maintain such as travel, attending large social or mass gatherings, or being in crowded indoor settings [9]. Its diagnostic performance for screening asymptomatic surgical candidates remains to be determined.

Review Methods

A comprehensive search on PubMed, Cochrane CENTRAL was done with the following search terms using our PICO: COVID-19, SARS-CoV-2, surgery, operation, preoperative, postoperative, testing, RT-PCR. We also searched for preprints on ChinaXiv, MedRxiv and Biorxiv and the reference lists of identified articles. The last search was done on 10 Mar 2021 without language restrictions. We used the following inclusion criteria for this review:

- Study design: randomized controlled trials, controlled clinical trials, observational studies
- Population: asymptomatic individuals scheduled for non-urgent, non-emergency surgery
- Exposure: clinical risk assessment or other pre-operative COVID-19 testing methods
- Outcome: diagnostic accuracy, post-operative outcomes, cost-effectiveness

For the outcome of diagnostic accuracy, we excluded studies that did not report sufficient data to calculate the sensitivity and specificity estimates.

There were no studies that provided direct evidence on the effects of clinical risk assessment and pre-operative RT-PCR testing vs clinical risk assessment alone on management decisions and post-operative outcome in asymptomatic patients scheduled for non-emergency surgery.

Results

Characteristics of included studies

Three eligible studies informed this review [10-12].

One retrospective cohort study assessed the accuracy of clinical risk assessment for screening COVID-19, using RT-PCR as reference standard. In this study, 99 asymptomatic adult patients (mean age 64.1 ± 30 years, scheduled for inpatient orthopedic surgery) underwent both clinical assessment (i.e., temperature testing and Centers for Disease Control and Prevention-based symptom screening questionnaires for COVID-19) and nasopharyngeal swab RT-PCR testing [10].

One multi-center, international, prospective cohort study [11] provided indirect evidence on the impact of pre-operative COVID-19 testing on post-operative outcomes (complications, mortality on day 30). The study involved a total of 140,231 consecutive patients who underwent elective or emergency surgery for any indication. Of these, 3,127 (2.2.%) were confirmed COVID-19 cases (1,384 or 44.3% were asymptomatic, 1,726 or 55.2% were symptomatic, and 17 or 0.5% had unknown symptom status). In this study, COVID-19 diagnosis was made based on either clinical or other objective tests: (a) RT-PCR swab in 79.5% (2486/3127), (b) rapid antigen test in 2.8% (87/3127), (c) CT scan in 3.8% (118/3127), (d) antibody test in 9.0% (280/3127), and (e) a clinical diagnosis in 5.0% (156/3127). However, the study did not report data to allow comparisons between these different types of pre-operative tests on both patients with or without symptoms.

The cost-effectiveness of pre-endoscopy SARS-CoV-2 testing and use of high risk PPE was assessed in one economic evaluation study [12]. The costs, effects, and incremental cost-effectiveness ratios (ICERs) were calculated for 8 different combinations of infection prevention and testing strategies. These testing strategies included clinical signs screening, decentralized point-of-care antigen test, centralized rapid PCR, and standard PCR test. A Monte Carlo simulation for 4 different prevalence rates (0.01%, 0.1%, 1%, and 5%) was done based on a model of 10,000 asymptomatic patients, 20 full-time HCWs wearing two N95 masks per day, and 250 working days.

Methodological quality

Overall quality of the body of evidence was downgraded to very low due to serious risk of bias, indirectness and serious imprecision (Appendix 2). The GRADE rating for retrospective cohort study was low; downgraded due to serious risk of bias and serious imprecision. The GRADE rating for the prospective cohort study was low; downgraded due to indirectness.

Outcomes

Diagnostic accuracy

Clinical risk assessment had a sensitivity of 0.42 (95% CI 0.15-0.72) and specificity of 0.85 (95% CI 0.76-0.92) based on 1 retrospective cohort study with very low quality [10]. This translates to a false negative rate of 0.58 and a false positive rate of 0.15.

Harms associated with a false negative

Indirect evidence showing the possible harms resulting from a false negative diagnosis was derived from the prospective cohort study which reported on the post-operative outcomes for patients tested for COVID-19. However, it was not possible to calculate risk ratios specifically for asymptomatic patients or for specific test methods (clinical risk assessment, antigen, RT-PCR). The certainty of this evidence was rated very low due to serious indirectness (combined data from asymptomatic and symptomatic, no subgroup analysis according to testing method).

Among patients who had elective surgery within 0-7 weeks after getting a positive result from any pre-operative COVID-19 test result (not specific to clinical or other testing methods), the risk of 30-day post-operative mortality and pulmonary complications were both at least 3 times higher (RR 3.96 (95% CI 3.41, 4.59) and (RR 3.41, 95% CI 3.04,3.83) compared to those who tested negative [11].

Surgeries that were delayed after ascertainment of the patients' COVID-19 status showed better post-surgical outcomes--however, this effect was only significant for surgeries done at least 7 weeks from COVID-19 diagnosis. In particular, post-operative mortality and complications were comparable to patients without COVID-19, with an RR of 1.46 (95% CI 0.73 - 2.92) and 1.37 (95% CI 0.91 - 2.08), respectively [11].

Cost-effectiveness

Very low certainty evidence suggests that universal pre-endoscopy virus testing using Ag-RDT, standard RT-PCR, or rapid PCR combined with high-risk PPE use in all patients irrespective of test results was found to be more cost-effective compared to no pre-endoscopy testing and no high risk PPE use, at an assumed prevalence rate of 1% or higher among asymptomatic individuals. Among the different tests, Ag-RDT with high-risk PPE was found to be the most cost-effective strategy (ICER = -26,286 €) followed by rapid PCR with high risk PPE use (ICER = -13,703 €) then standard RT-PCR (ICE= -11,128€). The high cost of standard PCR (273.35€) and rapid PCR (167.85€) compared with rapid Ag test (17.30€) as well as their turnaround times (standard PCR=2 days, Rapid PCR=1 day, Ag-RDT<1 day) seemed to favor Ag-RDT in terms of cost-effectiveness [13]. The quality for this evidence was very low due to very serious risk of bias (use of assumptions/simulations versus observational data, incomplete costing data) and serious indirectness (different country, healthcare system).

Recommendations from Other Groups

Both CDC (07 December 2020) and IDSA (23 December 2020) **suggest RT-PCR testing** of asymptomatic individuals without known exposure when the results will impact isolation/quarantine/personal protective equipment (PPE) usage decisions, dictate eligibility for surgery [9,13].

Similarly, IDSA **suggests RT-PCR** testing for asymptomatic individuals without known exposure to COVID-19 who are undergoing major time-sensitive surgeries (i.e., medically necessary surgeries that need to be done within 3 months). To limit potential poor outcomes, deferring non-emergent surgeries should be considered for patients testing positive for SARS-CoV-2. Decisions about PPE use for the aerosol generating portions of these procedures may be dependent on test results when PPE supplies are limited. However, due to the risk of false negatives, caution should be exercised by healthcare workers who will be in close contact with/exposed to the upper respiratory tract (e.g., anesthesia personnel, ENT procedures).

The Philippine Society for Microbiological and Infectious Diseases (PSMID) and Philippine Hospital Infection Control Society (PHICS) (26 May 2020) **recommend COVID-19 clinical risk**

assessment for patients about to undergo surgery, **and if available, RT-PCR**. Accessibility, turnaround time, and cost-effectiveness (cost of RT-PCR vs. cost of PPE) are important considerations when RT-PCR is to be requested. [5]

On the other hand, PSMID, and PHICS **recommend RT-PCR** particularly for individuals who will undergo high-risk surgical procedures, even if they are asymptomatic [5]. Other national and international groups **recommend preoperative RT-PCR testing**, some regardless of symptoms or exposure [14-18]

Research Gaps

Currently, there are no ongoing studies on this topic.

References

[1] Abate SM, Mantefardo B, Basu B. Postoperative mortality among surgical patients with COVID-19: a systematic review and meta-analysis. *Patient Saf Surg*. 2020;14(37). https://doi.org/10.1186/s13037-020-00262-6

[2] Lei S, Jiang F, Su W, et al. Clinical characteristics and outcomes of pa- tients undergoing surgeries during the incubation period of COVID-19 infection. EClinicalMedicine. 2020;21:100331.

[3] Nahshon C, Bitterman A, Haddad R, Hazzan D, Lavie O. Hazardous Postoperative Outcomes of Unexpected COVID-19 Infected Patients: A Call for Global Consideration of Sampling all Asymptomatic Patients Before Surgical Treatment. World J Surg. 2020 Aug;44(8):2477-2481. doi: 10.1007/s00268-020-05575-2. PMID: 32418028; PMCID: PMC7229873.

[4] Mizumoto K, Kagaya K, Zarebski A, Chowell G. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. Euro Surveill. 2020 Mar;25(10):2000180. doi: 10.2807/1560-7917.ES.2020.25.10.2000180. Erratum in: Euro Surveill. 2020 Jun;25(22): PMID: 32183930; PMCID: PMC7078829.

[5] Risk assessment of surgeries in the context of COVID-19. 26 May 2020. (available at https://www.psmid.org/wp-content/uploads/2020/05/PSMID-PHICS-Guidelines-for-Risk-Assessment-of-Surgeries-during-COVID19-26May2020.pdf). accessed 26 Dec 2020.

[6] Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, Tan W. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. JAMA. 2020 May 12;323(18):1843-1844. doi: 10.1001/jama.2020.3786. PMID: 32159775; PMCID: PMC7066521.

[7] Hong KH, Lee SW, Kim TS, Huh HJ, Lee J, Kim SY, Park JS, Kim GJ, Sung H, Roh KH, Kim JS, Kim HS, Lee ST, Seong MW, Ryoo N, Lee H, Kwon KC, Yoo CK. Guidelines for Laboratory Diagnosis of Coronavirus Disease 2019 (COVID-19) in Korea. Ann Lab Med. 2020 Sep;40(5):351-360. doi: 10.3343/alm.2020.40.5.351. PMID: 32237288; PMCID: PMC7169629.

[8] Long DR, Gombar S, Hogan CA, Greninger AL, O'Reilly-Shah V, Bryson-Cahn C, Stevens B, Rustagi A, Jerome KR, Kong CS, Zehnder J, Shah NH, Weiss NS, Pinsky BA, Sunshine J. Occurrence and Timing of Subsequent SARS-CoV-2 RT-PCR Positivity Among Initially Negative Patients. Clin Infect Dis. 2020 Jun 7:ciaa722. doi: 10.1093/cid/ciaa722. Epub ahead of print. PMID: 32506118.

[9] COVID-19 Testing Overview 07 Dec 2020. (available at https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/testing.html) Accessed 26 Dec 2020.

[10] Gruskay JA, Dvorzhinskiy A, Konnaris MA, LeBrun DG, Ghahramani GC, Premkumar A, DeFrancesco CJ, Mendias CL, Ricci WM. Universal Testing for COVID-19 in Essential

Orthopaedic Surgery Reveals a High Percentage of Asymptomatic Infections. J Bone Joint Surg Am. 2020 Aug 19;102(16):1379-1388. doi: 10.2106/JBJS.20.01053. PMID: 32516279.

[11] Timing of surgery following SARS-CoV-2 infection: an international prospective cohort study. COVIDSurg Collaborative. Anaesthesia. Published 09 March 2021. (Available at https://associationofanaesthetists-publications.onlinelibrary.wiley.com/action/doSearch?ContribAuthorStored=COVIDSurg+Collaborative). https://doi.org/10.1111/anae.15458

[12] Ebigbo A, Römmele C, Bartenschlager C, Temizel S, Kling E, Brunner J, Messmann H. Cost-effectiveness analysis of SARS-CoV-2 infection prevention strategies including pre-endoscopic virus testing and use of high risk personal protective equipment. Endoscopy. 2021 Feb;53(2):156-161. doi: 10.1055/a-1294-0427. Epub 2020 Oct 20. PMID: 33080647; PMCID: PMC7869042.

[13] The Infectious Diseases Society of America Guidelines on the Diagnosis of COVID-19: Molecular Diagnostic Testing. 23 Dec 2020. (Available at https://www.idsociety.org/practice-guideline/covid-19-guideline-diagnostics/). 11

[14] SAGES and EAES recommendations regarding surgical response to covid-19 crisis. March 30, 2020. (Available at https://www.sages.org/recommendations-surgical-response-covid-19/)

[15] Novel Coronavirus 2019 (COVID-19) Practice Advisory. American College of Obstetricians and Gynecologists. December 14, 2020. (Available at https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/03/novel-coronavirus-2019)

[16] A Guidance for clinicians on the obstetric management of patients with coronavirus disease 2019 (COVID-19). October 2020 second edition. (Available at https://pogsinc.org/wp-content/uploads/2020/11/POGS-PIDSOG-COVID19-Handbook-2nd-edition-Oct-2020-FINAL-COPY.pdf

[17] PCS Guidelines on post-ECQ resumption of elective surgeries and outpatient clinics. PCS Guidelines on COVID-19. April 20, 2020. (Available at https://pcs.org.ph/index/page?id=pcs-guidelines-on-covid-19).

[18] WHO's antigen detection in the diagnosis of SARS-CoV-2 infection using rapid immunoassays. Interim guidance. 11 September 2020. https://www.who.int/publications/i/item/antigen-detection-in-the-diagnosis-of-sars-cov-2infection-using-rapid-immunoassays.

Appendix 1. Characteristics of Included Studies

Author	Study Design	Patient Selection	Outcome
Gruskay 2020	Retrospective cohort	n=99 Symptomatic and asymptomatic patients who had preoperative RT-PCR testing prior to orthopedic surgery	Sensitivity Specificity
COVIDSrug Collaborative 2021	International, prospective cohort	n=96,018 Symptomatic and asymptomatic RT-PCR-confirmed COVID-19 Patients without COVID-19 diagnosis	Post-operative complications and 30-day post-operative mortality within 0-2 weeks after COVID-19 diagnosis Post-operative complications 30-day post-operative mortality if elective surgery was delayed from at least 7 weeks after COVID-19 diagnosis

Author	Study Design	Patient Selection	Outcome
Ebigbo 2020 Germany	Model- based assumption	10 000 asymptomatic patients scheduled for endoscopy	Incremental Cost-effectiveness Ratio

Appendix 2. GRADE Evidence Profile

Sensitivity	0.42 (95% CI: 0.19 to 0.68)
Specificity	0.85 (95% CI: 0.76 to 0.91)

Outcome	№ of studies (№ of patients)	Study design	Factors that may decrease certainty of evidence					Effect per 1,000 patients tested			Test accuracy CoE
			Risk of bias	Indirectness	Inconsistency	Imprecision	Publication bias	pre-test probability of 5%	pre-test probability of 24%	pre-test probability of 32%	
True positives (patients with COVID-19)	1 studies 12 patients	cross-sectional (cohort type accuracy study)	serious [1,a,b]	not serious	not serious	serious [1,c]	none	21 (10 to 34)	101 (46 to 163)	134 (61 to 218)	⨁⨁◯◯ LOW
False negatives (patients incorrectly classified as not having COVID-19)								29 (16 to 40)	139 (77 to 194)	186 (102 to 259)	
True negatives (patients without COVID-19)	1 studies 87 patients	cross-sectional (cohort type accuracy study)	serious [1,a,b]	not serious	not serious	not serious [1,c]	none	808 (722 to 864)	646 (578 to 692)	578 (517 to 619)	⨁⨁⨁◯ MODERATE
False positives (patients incorrectly classified as having COVID-19)								142 (86 to 228)	114 (68 to 182)	102 (61 to 163)	

Explanations

a. The interval between clinical risk assessment and RT-PCR testing was not reported.
b. The study excluded 42 patients (30% of the recruited participants) who had clinical risk assessment but no RT-PCR testing.
c. The sample size was small (n=99).

References

1. JA, Gruskay, A, Dvorzhinskiy, MA, Konnaris, DG, LeBrun, GC, Ghahramani, A, Premkumar, CJ, DeFrancesco, CL, Mendias, WM, Ricci. Universal Testing for COVID-19 in Essential Orthopaedic Surgery Reveals a High . The Journal of bone and joint surgery. American volume; 2020.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	COVID-19 patients	non-COVID-19 patients	Relative (95% CI)	Absolute (95% CI)		
Postoperative 30-day mortality												
1	observational studies	not serious	not serious	very serious [1,a,b]	not serious	none	17/338 (5.0%)	588/9568 0 (0.6%)	**RR 8.18** (5.11 to 13.10)	**44 more per 1,000** (from 25 more to 74 more)	⨁◯◯◯ VERY LOW	
Pulmonary complications												
1	observational studies	not serious	not serious	very serious [1,a,b]	not serious	none	21/338 (6.2%)	1720/956 80 (1.8%)	**RR 3.46** (2.28 to 5.24)	**44 more per 1,000** (from 23 more to 76 more)	⨁◯◯◯ VERY LOW	
Post-operative mortality (Surgery delayed for at least 7 weeks after COVID-19 diagnosis)												
1	observational studies	not serious	not serious	very serious [1,a,b]	not serious	none	8/892 (0.9%)	588/9568 0 (0.6%)	**RR 1.46** (0.73 to 2.92)	**3 more per 1,000** (from 2 fewer to 12 more)	⨁◯◯◯ VERY LOW	
Post-operative complications (Surgery delayed for at least 7 weeks after COVID-19 diagnosis)												
1	observational studies	not serious	not serious	very serious [1,a,b]	not serious	none	22/892 (2.5%)	1720/956 80 (1.8%)	**RR 1.37** (0.91 to 2.08)	**7 more per 1,000** (from 2 fewer to 19 more)	⨁◯◯◯ VERY LOW	

CI: Confidence interval; **RR:** Risk ratio

Explanations

a. The study compared the outcomes of surgery between those with COVID-19 or no COVID-19 based on PCR testing, rather than outcomes of surgery based on clinical risk assessment alone vs clinical risk assessment and PCR testing

b. There was indirectness that was attributed to combined symptomatic (55.2%) and asymptomatic (44.8%) COVID-19 patients.

References

1. Collaborative, COVIDSurg,Collaborative,,GlobalSurg. Timing of surgery following SARS-CoV-2 infection: an international prospective cohort study. 2021.

Appendix 3. Forest Plot

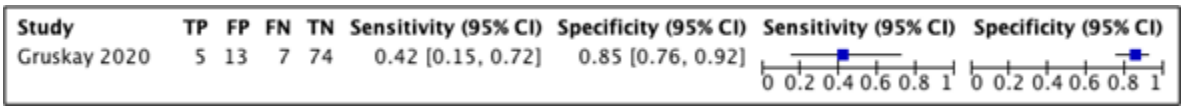

Figure 1. Forest plot of the sensitivity and specificity of clinical risk assessment in diagnosing COVID-19.

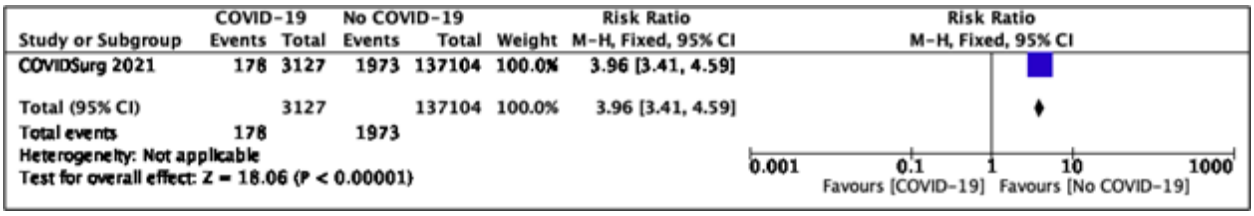

Figure 2. Forest Plot of Post-operative mortality

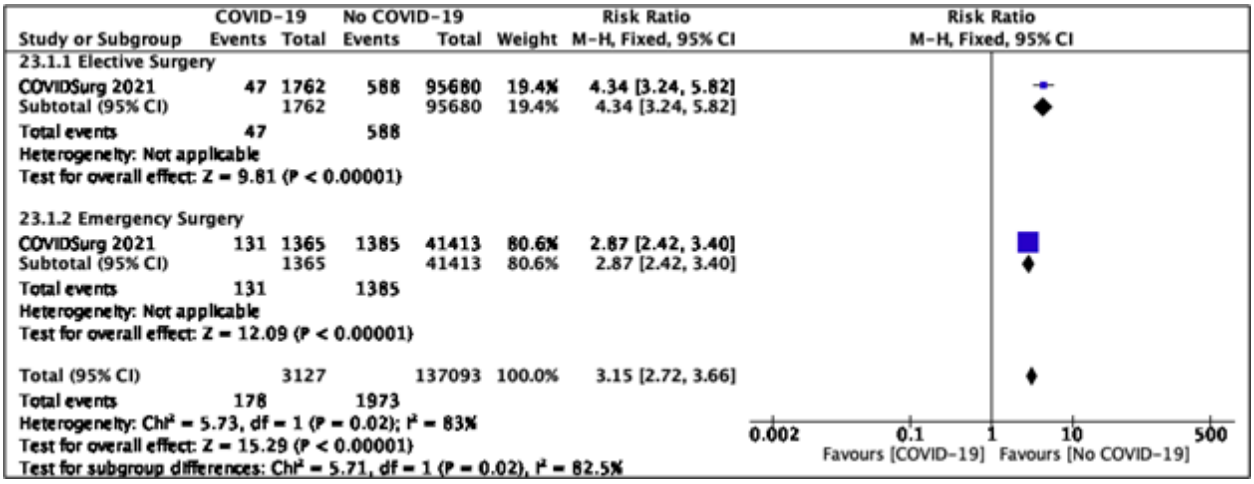

Figure 3. Forest Plot of Post-operative mortality (urgency of surgery)

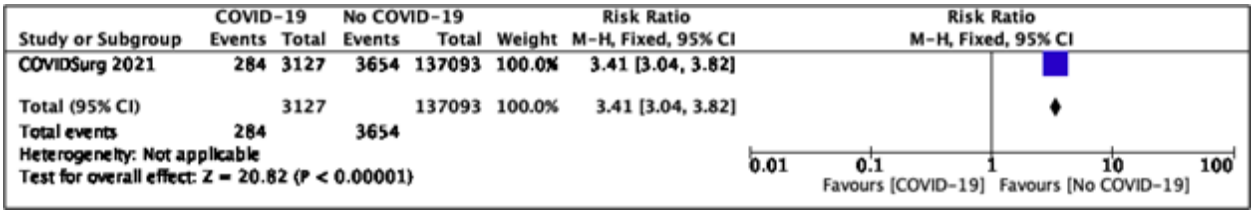

Figure 4. Forest Plot of Pulmonary Complications

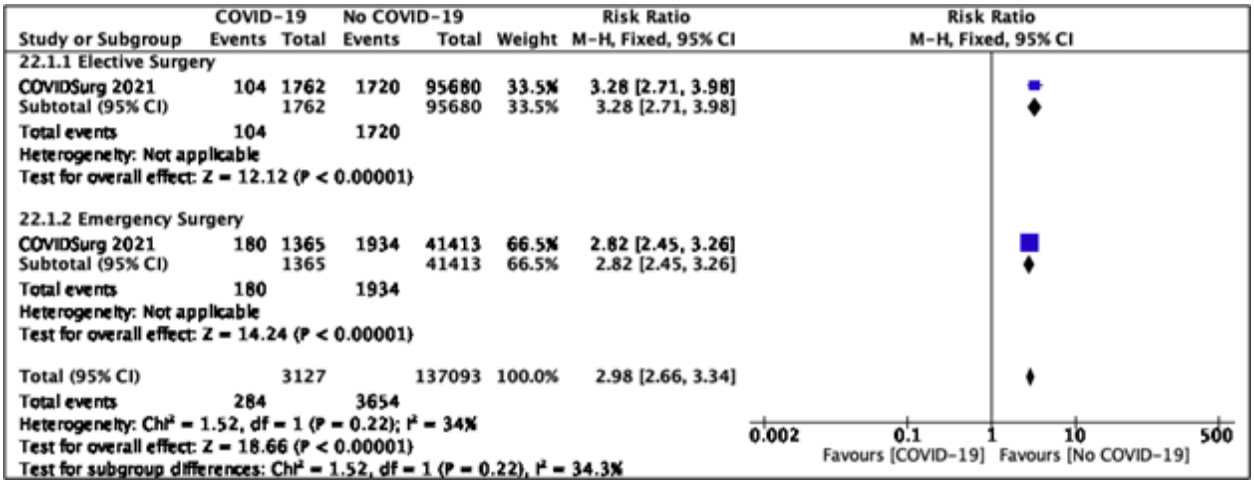

Figure 5. Forest Plot of Post-operative pulmonary complications (urgency of surgery)

Appendix 4. Cost Effectiveness of Pre-endoscopy testing and use of high-risk PPE (Emigmo, 2020)

Strategy		ICER value		
		Prevalence		
		0.01% (0.005-0.02) €	1% (0.5-2%) €	5% (2.5-10%) €
Control Strategy: No diagnostic test No high risk PPE				
Ag test	no high risk PPE	11,774	-13,035	-15,240
	high risk PPE	17,451	-22,716	-26,286
Rapid PCR	no high risk PPE	145,570	345	-12, 564
	high risk PPE	155, 150	659	-13,073
Standard PCR	no high risk PPE	249,022	10,690	-10,495
	high risk PPE	258,557	10,887	-11, 128

Appendix 5. Sensitivity and specificity of the tests (Emigmo, 2020)

	Standard PCR Cobas Assay	Rapid PCR Xpert Cepheid	Rapid Antigen test
Sensitivity (95% CI)	0.97 (0.92-0.97)	0.95 (0.92-0.98)	0.57 (0.48-0.6)
Specificity (95% CI)	1.00 (0.96- 0.99)	1.00 (0.96-0.99)	1.00 (0.98-0.99)

Appendix 6. Cost and turn-around time of SARS-CoV2 virus tests (Emigmo, 2020)

	Standard PCR test	Rapid PCR test	Rapid Ag test
Cost (€)	273.35	167.85	17.30
Turnaround time (hours)	48	24	-------